Developing a Qualified Workforce to Fight the War on Terror

Dale H. von Haase
Director, Aerospace Science
Lockheed Martin Corporation

Outline

- Demographic projections indicate a worsening situation with respect to the availability of qualified technologists and engineers
- Replacing retirees poses challenges in all age groups – from elementary school to post doctoral to professional career
- In this presentation, the problems in each age group are addressed and some views are presented for discussion on how the situation could be improved

The Demographics

- Lower Birth Rate
  - 28% decline in Births from the Baby Boom Peak – Our current labor force, consisting of many Baby Boomers, will have to be replaced from a much smaller pool.
- Engineering enrollments down
  - According to NSF data, full time engineering enrollments have declined from a peak of over 400,000 in 1984, to approximately 320,000 in 1999.
- Aging workforce
  - Over 54% of the S&T workforce is over 45
- Fewer US citizens in universities
  - Often difficult to obtain security clearances
  - Particularly in graduate school

The K-12 Environment Today

- Fewer students are interested in math and science.
- Many studies indicate that children are “turned off” to math and science in as early as the 4th grade.
- Many school districts are forced to use teachers who are not credentialed in either math or science.
- Assertion: If a teacher found math and science to be difficult, he or she will transfer that fear to his or her students

The College Environment Today

- Engineers have a less than desirable image - they are often viewed as nerds
- When incoming freshmen select a major, they note that the people on:
  - *LA Law* and *Ally McBeal* have the most fun and
  - *ER* has all the excitement
  - And the Business Administration majors, especially those with MBA's, command huge salaries
  - They also note that all those Computer Science majors saw their futures dimmed by the recent "dot-com" implosion

The Engineering Graduate Today

- Fields other than Aerospace beckon - one recent grad: “Aerospace is a career of last resort”
- Assertion No. 1: The pace of aerospace has slowed dramatically over the years.
- Assertion No. 2: We have become intolerant of failure and are often gripped by a “paralysis of analysis”.

The Former Pace of Aerospace

- In February 1958, President Eisenhower authorized the start of the Corona Project. Two and a half years later, in August 1960, the first images ever recovered from space were snatched in mid-air over the Pacific Ocean.

- In February 1962, Lt. Col. John Glenn became the first American to orbit the earth. Little more than seven years later, Neil Armstrong and Edwin Aldrin became the first humans to set foot on the moon and return safety to the earth.

- In October 1978, the Air Force awarded Lockheed a contract for the F-117 Stealth Fighter. Five years later, 10 production aircraft had been delivered, a base had been build, crews had been trained and an Initial Operational Capability existed.

Tolerance for Failure

- Sidewinder Air-to-Air Missile – More than 110,000 built for 27 nations and the most widely used missile in the West. Failed 13 times before the first successful intercept.

- Corona Project – Produced the first images from space ever returned to earth and became the forerunner of all space reconnaissance programs. Failed twelve times before it succeeded.

- Polaris Sub-Launched Ballistic Missile – First in a long line of Fleet Ballistic Missiles that evolved into today's Trident D-5. Suffered 66 failures out of 123 early attempts.

Summary of Today's Environment

- Children turned off early to math and science
- Under-prepared, (and underpaid) teachers in the classroom
- Fewer students choosing engineering as their major
- Fewer graduate engineers choosing aerospace careers
- An industry whose pace is not what it once was in an environment where developmental failures are not tolerated
- September 11 requires us to change!

The Desired K-12 Environment

- Students should not believe that math and science are “hard”. They may be hard for some but not for others – just like playing the piano, writing poetry or playing basketball.
- Teachers should be credentialed in the subjects they teach. If we have to pay math and science teachers more, we should. (We are willing to pay huge salaries to athletes and entertainers.)
- We should encourage people with a talent for math and science to become teachers and provide a safe, disciplined environment for them to practice their skill.
- Recruit retiring engineers – however, don’t require them to take multiple years of education classes to learn how to teach. There should be a set of tests to see who can teach and who can’t.
- Use today’s engineers as role models

The Desired College Environment

- The image of being an engineer is good one. Engineering students in Paris, for example, lead the Bastille Day parade each year.
- US Citizens are recruited as vigorously as foreign students. Colleges are starting to recognize this problem.
- Scholarships for future engineers (and math and science teachers) are provided by the government
- There may never be a show called *"LA Engineer"* but ….

The Desired Aerospace Engineering Environment

- We need to put urgency back into aerospace programs. Hopefully, the War on Terrorism will provide the initiative. Not only are long protracted development programs a deterrent to keeping good engineers interested, they cost more and they arrive in the war fighter's hands too late.

- We need to educate the public that failures in development, while undesired, are not unexpected.

- We need to work to make Aerospace Engineering a first career choice!

Conclusions

- Math and Science are not difficult for every child – let's put as much emphasis on finding those talents as we put on finding the next Heisman trophy winner.
- Aerospace (and other fields that can fight terrorism) need to regain there sense of urgency.
- We can and will develop the programs and products that will contribute to the defeat of terrorism.


Can Osama come out and play???

Thank You